TABLE 96
Impact of artificial intelligence technology on worker types, by industry: 2016–18
(Number and percent)

				Production	n worker	s			Nonp	oroduc	ction	n workers	;			Supervisory	/ workers			Nonsupervisory workers					
Industry	NAICS code	Companies (number)	Increased	d Decrease	Did no			Increase	ed De	crease	ed	Did not change	Did not employ	Increas	sed	Decreased	Did not change	Did no emplo	-	ased	Decreas	sed	Did not change	Did no emplo	
All industries	11, 21- 23, 31- 33, 42-81	141,159	9.8	3.3	52.5	34.	4	7.1		3.8		63.6	25.5	7.6		2.6	66.5	23.3	8.	3	3.5		65.9	22.3	
Manufacturing industries	31-33	6,327	14.1	8.7	67.1	10.	1	11.1		4.7		75.1	9.1	8.3		3.8	79.8	8.1	9.	8	5.9		74.8	9.5	
Food	311	323	14.7	r 18.4	62.9	4.	0 r	28.3	r	1.5		63.6	6.6 r	9.6	r	D	84.8	4.0	r 9.	0 r	10.5	r	73.0	7.4	
Beverage and tobacco products	312	120	19.0	15.7	53.7	11.	6 r	25.0	1	10.0	r	60.0	D	16.4	r	0.0	73.7	9.8	r 11.	7 r	15.8		66.7	D	
Textile, apparel, and leather products	313- 16	156	9.0	r D	84.6	6.	4	31.9	r	4.5	r	63.6	D	7.7		D	89.7	0.0	3.	8	4.5	r	90.4	D	
Wood products	321	191	8.4	r 3.1	88.4	0.	0	D		D		95.3	2.6 r	D		D	97.9	D)	3.1		94.8	D	
Paper	322	18	D	D	72.2		D	D		0.0		100.0	0.0	D		0.0	100.0	0.0		5	D		77.8	0.0	
Printing and related support activities	323	385	5.7	6.0	84.2	4.	2	4.9		5.5	r	71.4	18.3 r	3.4		D	88.6	6.8	4.	4	D		88.8	5.7	
Petroleum and coal products	324	4	D	0.0	D	0.	0	D		0.0		D	0.0	D		0.0	D	0.0		0	0.0		D	0.0	
Chemicals	325	262	19.1	8.4	r 58.8	13.	7 r	13.8	1	13.8	r	64.0	8.4 r	23.8	r	2.7 r	65.1	8.4	r 19.	1	D		71.0	8.4	
Pesticide, fertilizer, and other agricultural chemical manufacturing	3253	0	0.0	0.0	0.0	0.	0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.	0	0.0		0.0	0.0	
Pharmaceuticals and medicines	3254	40	D	0.0	77.5	12.	5 r	D		D		77.5	10.0 r	0.0		D	77.5	10.0	r	0	0.0		80.0	10.0	
Soap, cleaning compound, and toilet preparation manufacturing	3256	48	10.4	r D	45.8	r	D	D		0.0		64.6	D	18.8	r	0.0	54.2 r	, D	10.	4 r	0.0		60.4	D	
Other chemicals	other 325	174	23.6	8.6	r 57.5		D	16.7	r 1	19.5	r	60.3	D	30.5	r	D	64.4	D	23.	6	D		71.8	D	
Plastics and rubber products	326	236	20.2	r 5.9	69.7	4.	2 r	23.8	r	5.4		67.5	3.3 r	15.8	r	2.1 r	77.9	4.2	r 23.	5 r	4.7		66.4	5.5	
Nonmetallic mineral products	327	131	5.3	r D	87.8		D	6.9	r	3.8		84.7	D	8.4	r	D	87.0	D	8.	4 r	D		85.5	D	
Primary metals	331	50	10.0	D	80.0		D	16.0	r	D	\Box	76.0	D	D		D	86.0	D	10.	0	D		80.0	D	

TABLE 96
Impact of artificial intelligence technology on worker types, by industry: 2016–18
(Number and percent)

				Product	ion v	vorkers				N	lonprodu	ıctio	n worker	's				;	Superviso	ory	workers					Ne	onsuperv	/iso	ry worker:	3
Industry	NAICS code	Companies (number)		d Decrea	sed	Did not change			Increas	sed	Decrea	sed	Did not change	. .	l no	-	ncreas	ed	Decrease	ed	Did not change		Did no emplo		Increas	ed	Decreas	sed	Did not change	
Fabricated metal products	332	1,517	18.1	10.3	r	62.6	9.0	r	5.3		2.1		85.2	7	.4		6.5	r	2.4	r	85.6		5.5		5.8	r	6.4	r	77.8	10.0
Machinery	333	887	7.7	2.7		76.3	13.3	r	9.4	r	1.4	r	81.7	7	.6	r	4.4	r	1.2	r	80.2		14.2	r	11.0		1.6	r	68.2	19.2 r
Computer and electronic products	334	442	15.2	6.1	r	62.7	16.1		19.7		5.9	r	64.8	9	.5		13.0		2.3	r	74.7		10.0	r	17.1		3.8	r	68.9	10.2 r
Communications equipment	3342	55	D	0.0		80.0	14.5	r	D		D		56.4		D		0.0		D		85.5		D		D		D		85.5	D
Semiconductor and other electronic components	3344	111	7.3	r 10.9	r	62.8	19.1	r	11.7		D		77.5	3	.6	r	11.6	r	0.0		69.7		18.7	r	8.1	r	D		72.1	D
Navigational, measuring, electromedical, and control instruments	3345	194	28.4	7.2	r	53.1	11.3		25.5	r	4.1	r	60.2	10	.2	r	21.6	r	4.6	r	67.5		D		31.4		5.2	r	57.7	D
Other computer and electronic products	other 334	83	D	0.0		72.3	24.1	r	15.9	r	0.0		63.4	20	.7	r	D		0.0		91.6		D		D		0.0		79.5	18.1 r
Electrical equipment, appliances, and components	335	212	28.3	r D		56.6	7.1	r	14.5	r	4.7	r	68.6	12	.2		10.8		4.7	r	76.5		8.0	r	17.9	r	D		67.5	8.0 r
Transportation equipment	336	349	11.5	r 1.7		58.3	28.6	r	11.2	r	D		59.6	28	.7	r	8.9	r	D		62.2		28.1	r	10.9	r	D		70.8	17.2 r
Automobiles, bodies, trailers, and parts	3361- 63	293	10.9	r D		56.7	32.1	r	11.6	r	D		55.3	32	.4	r	10.2	r	D		57.3	;	32.1	r	10.6	r	D		70.0	19.1 r
Aerospace products and parts	3364	35	22.9	D		71.4	D		14.7		0.0		85.3	0	.0		D		0.0		94.3		0.0		14.3		0.0		85.7	0.0
Other transportation	other 336	19	D	D		57.9 r	D		0.0		0.0		73.7	r	D		0.0		0.0		73.7	r	D		D		0.0		63.2	r D
Furniture and related products	337	382	15.4	32.3		48.3	3.9	r	11.3		28.2	r	56.6	3	.9	r	10.7		27.5	r	58.9		D		7.6	r	28.3	r	59.6	4.5 r
Miscellaneous	339	666	13.1	7.1	r	68.0	11.8		6.2		1.1	r	82.8	9	.9		7.1		4.7	r	81.1		7.1		9.0		4.5	r	80.0	6.5
Medical equipment and supplies	3391	284	16.3	r 10.8	r	62.4	10.5	r	6.3	r	D		78.5	13	.7	r	9.9	r	D		75.4		6.0	r	6.0	r	D		83.1	D
Other miscellaneous manufacturing	3399	383	11.1	4.4		71.8	12.7	r	6.3		D		86.2	7	.3	r	5.2		D		85.9		7.8	r	11.5		2.6	r	78.1	7.8 r

TABLE 96
Impact of artificial intelligence technology on worker types, by industry: 2016–18
(Number and percent)

				Production	worke	rs			Nonp	roduct	ion w	orkers				Supervisory	workers		Nonsupervisory workers					
Industry	NAICS code	Companies (number)		Decreased	Did i		Did not employ	Increase	d De	crease		id not nange	Did not employ	Increas	ed	Decreased	Did not change	Did not employ	Increased	Decrea	sed	Did not change	Did not employ	
Nonmanufacturing industries	11, 21- 23, 42-81	134,833	9.6	3.0	51.9		35.5	7.0		3.8	6	52.9	26.3	7.6		2.6	65.8	24.0	8.2	3.4		65.5	22.9	
Agriculture, forestry, fishing, and hunting	11	300 r	D	D	51.0		D	0.0		D	4	15.0	54.3	0.0		0.0	62.7	D	0.0	D		49.7	D	
Mining, extraction, and support activities	21	258	1.2	D	67.8	3	29.8 r	1.6	r	D	g	91.1	6.2 r	22.9	r	D	72.9	4.3	1.9	D		94.2	3.1	
Utilities	22	65	D	0.0	73.8	3	24.6 r	D		0.0	8	31.5	16.9 r	D		0.0	84.6	10.8 r	4.7	0.0		84.1	11.1	
Construction	23	10,274	17.3	5.0	57.7	7	20.0	8.6		3.1	6	57.8	20.5	11.0		4.7	69.9	14.4	11.3	1.9		70.0	16.8	
Wholesale trade	42	5,293	9.6	4.4	54.8	3	31.2	13.9		3.5	6	55.7	16.9	12.5		3.1	69.4	15.0	12.0	2.7	r	71.3	14.0	
Retail trade	44-45	13,168	7.2	4.7	55.7	'	32.4	7.6		6.1	6	51.2	25.1	9.4		3.6	65.2	21.8	9.6	5.7		63.7	21.0	
Transportation and warehousing	48-49	3,527	9.2	0.2	r 49.7	,	40.8	4.5		3.8	r 6	51.2	30.5	8.1		2.5 r	62.4	27.0	8.1	0.3	r	68.6	23.0	
Information	51	4,039	10.9	2.4	53.1		33.6	13.7		1.9	6	55.1	19.3	10.1		0.9	69.5	19.5	12.5	1.9		66.5	19.1	
Publishing	511	1,331	10.5	3.3	r 57.0		29.2	13.4	r	1.6	6	55.7	19.3	11.6		0.7 r	70.8	17.0	12.1	1.8		68.9	17.3	
Newspaper, periodical, book, and directory publishers	5111	361	D	9.4	r 60.7	,	20.8	8.9	r	4.7	6	57.2	19.2	D		D	81.2	14.4	D	3.6		74.2	19.9	
Software publishers	5112	970	10.9	1.0	r 55.5	5	32.6	14.9	r	D	6	55.3	19.3	14.9	r	D	67.0	17.7	15.8	1.0	r	67.0	16.2	
Telecommunications	517	275	12.6	2.2	53.6	5	31.7	13.1		D	6	52.5	22.2	5.8	r	D	74.2	18.5 r	6.9	D		73.5	18.2	
Data processing, hosting, and related services	518	1,168	13.5	2.2	47.0		37.2	20.8		2.5	r 5	59.7	17.1	11.7		1.4	68.7	18.2	19.7	2.1		61.8	16.4	
Other information	other 51	1,263	8.6	1.7	r 54.4	L	35.3	7.8		1.7	6	59.8	20.7	7.9		0.9	67.7	23.6	7.8	1.9	r	66.6	23.8	
Finance and insurance	52	8,784	8.6	3.3	58.7	· 🗌	29.4	6.7		5.0	6	6.7	21.6	5.9		4.0	72.1	18.0	8.7	5.5		69.9	15.9	
Real estate and rental and leasing	53	8,541	6.6	1.5	r 46.3	3	45.6	5.5		D	5	57.0	36.6	5.3		D	58.2	35.5	5.5	2.9		56.2	35.4	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	

TABLE 96
Impact of artificial intelligence technology on worker types, by industry: 2016–18
(Number and percent)

				Production	worke	rs		1	Nonprod	uctio	n worke	rs		Sup	ervisory	workers		Nonsupervisory workers					
Industry	NAICS code	Companies (number)		Decrease		not D ige er		Increased	Decrea	sed	Did no change		ncreased	d De	reased	Did not change		Increased	d Decr	ease		Did not change	Did not employ
Other real estate and rental and leasing	other 53	8,541	6.6	1.5	r 46.3	4	5.6	5.5	D		57.0	36.6	5.3		D	58.2	35.5	5.5	2	9		56.2	35.4
Professional, scientific, and technical services	54	38,008	9.4	1.0	47.5	4	2.1	7.8	2.2		62.0	28.0	6.9		0.9	63.4	28.8	8.1	1	4		63.6	26.9
Legal services	5411	5,965	5.1	0.5	r 42.1	5	52.3	3.5	2.5	r	60.2	33.8	5.0		0.0	62.3	32.7	4.0	1	6	r	63.3	31.1
Accounting, tax preparation, bookkeeping, and payroll services	5412	4,980	10.1	1.1	r 41.9	4	6.9	4.5	3.8	r	68.1	23.6	2.1	r	1.5 r	66.1	30.3	5.0	1	.9	r	72.0	21.1
Architectural, engineering, and related services	5413	3,046	15.8	1.4	42.9	3	9.8	14.6	2.9	r	52.8	29.7	9.6		2.0 r	60.4	28.0	10.2	1	.0		61.7	27.1
Specialized design services	5414	1,174	D	D	52.0	4	7.6	D	D		61.9	33.5	0.0		0.0	65.8	34.2	0.0		D		62.3	37.6
Computer systems design and related services	5415	11,681	10.5	1.5	54.0	3	34.0	8.6	2.1		64.7	24.6	8.4		0.9 r	68.8	21.9	9.5	1	2		66.9	22.4
Management, scientific, and technical consulting services	5416	6,676	9.8	D	49.1	4	0.9	9.8	0.3	r	60.5	29.4	10.1		1.2 r	54.5	34.2	11.9	0	9	r	54.4	32.8
Scientific research and development services	5417	861	11.7	1.4	r 45.8	4	1.0	19.2	1.5		63.3	16.1	11.6		1.3 r	69.8	17.3	17.4	1	.5		60.8	20.2
Advertising, public relations, and related services	5418	1,365	7.6	r 1.8	45.9	4	4.8	11.3	1.0		53.6	34.1	5.8		0.7	60.0	33.5	7.8	0	9		62.3	29.0
Other professional, scientific, and technical services	5419	2,263	9.1	D	40.7	4	8.4	4.6 r	3.8	r	60.5	31.1	4.1	r	D	60.2	35.6	5.7	r 3	.6	r	60.6	30.1
Management of companies and enterprises	55	91	r 0.0	0.0	С		D	D	0.0		41.8	r 0.0	D		0.0	41.8	r 0.0	0.0	0	.0	1	100.0	0.0
Administrative and support and waste management and remediation services	56	7,687	11.9	2.9	47.8	3	37.4	8.0	5.2		60.4	26.4	8.6		2.9	64.3	24.2	11.2	2	4	r	63.4	23.0

TABLE 96
Impact of artificial intelligence technology on worker types, by industry: 2016–18
(Number and percent)

				Production	workers			Nonprodu	ction worke	rs		Supervisory	workers		Nonsupervisory workers					
Industry	NAICS code	Companies (number)		d Decreased	1	Did not employ		d Decreas	Did no change			d Decreased		Did not employ	Increased	Decreased	Did not change	Did not employ		
Educational services	61	1,564	8.0	r D	38.7	50.4	6.4	r D	51.7	36.4	9.9	D	62.7	24.6	16.8 r	10.9	52.2	20.1		
Health care and social assistance	62	16,796	7.8	3.0	52.0	37.2	2.6	3.4	67.8	26.2	5.0	2.3	68.1	24.6	5.6	4.5	69.2	20.7		
Health care services	621- 23	15,746	7.0	2.7	53.3	37.0	2.8	3.4	68.2	25.6	4.5	2.2	68.9	24.4	5.7	4.0	69.7	20.6		
Social assistance	624	1,051	19.7	D	32.6	39.5	0.0	D	60.6	35.2	12.0	r D	56.3	27.3	D	12.4 r	60.1	23.5		
Arts, entertainment, and recreation	71	1,442	D	D	49.2	50.6	0.6	D	61.6	37.7	D	3.6 r	71.8	21.8	3.5 r	6.8 r	67.9	21.8		
Accommodation and food services	72	8,936	15.1	8.2	57.9	18.8	6.4	10.2	61.3	22.1	9.9	6.3	68.1	15.7	7.8	8.2	64.7	19.3		
Other services	81	6,055	5.1	3.3	r 56.9	34.7	3.8	r 3.2	r 60.7	32.3	3.1	r 2.8	65.4	28.7	2.2 r	3.5 r	66.7	27.6		

D = withheld to avoid disclosing data for individual companies; data are included in higher-level totals. r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2019 Annual Business Survey: Data Year 2018.